Tuberculosis

Dr \ Nashwan Mansoor

Tuberculosis

❖ **Definition :-**

Tuberculosis is a communicable, chronic granulomatous disease, caused by mycobacterium tuberculosis. It is usually involves the lungs but may affect any organ or tissue of the body.

➢ **Etiology:- three types of mycobacterium;**

- **Mycobacterium tuberculosis: - is the most common cause of infection in human.**
- **Tuberculin boves :- (reservoir cattle) may the cause of infection in human who use unpasteurized milk.**
- ***M. africanum* (reservoir humans).**
- **A typical or opportunistic mycobacterium affecting immuno-compromised human.**

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Tuberculosis

❖ *Pathology and pathogenesis*

- ***M. bovis*** **infection arises mainly drinking non-sterilized milk from infected cows.**
- ***M. tuberculosis*** **is spread by the inhalation of aerosolized droplet nuclei from other infected patients.**
- **Once inhaled, the organisms lodge in the alveoli and initiate the recruitment of macrophages and lymphocytes.**
- **Macrophages undergo transformation into epithelioid and Langhans cells, which aggregate with the lymphocytes to form the classical tuberculous granuloma.**

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❖ *Pathology and pathogenesis*

- **Numerous granulomas aggregate to form a primary lesion or ‘Ghon focus’ (a pale yellow, caseous nodule, usually a few millimeters to 1–2 cm in diameter), which is characteristically situated in the periphery of the lung.**

- **Spread of organisms to the hilar lymph nodes is followed by a similar pathological reaction, and the combination of the primary lesion and regional lymph nodes is referred to as the ‘primary complex of Ranke’.**

- **Reparative processes encase the primary complex in a fibrous capsule, limiting the spread of bacilli.**

- **If no further complications ensue, this lesion eventually calcifies and is clearly seen on a chest X-ray.**

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Tuberculosis

❖ *Pathology and pathogenesis:-*

- **Lymphatic or hematogenous spread may occur before immunity is established, however, seeding secondary foci in other organs, which may lie dormant for years.**

- **The only clue that infection has occurred may be the appearance of a cell-mediated, delayed-type hypersensitivity reaction to tuberculin, demonstrated by tuberculin skin testing or an interferon gamma release assay (IGRA): so-called latent TB.**

- **If these reparative processes fail, primary progressive disease ensues.**

- **half of this risk occurring in the first 2 years after infection.**

Tuberculosis

❖ **Types of pulmonary tuberculosis :-**

- **Primary tuberculosis; usually in children, refers to the infection of a previously uninfected (tuberculin-negative) individual.**
- **May fate to any of the following:-**

⇒ **Healing and calcification.**

⇒ **Progressive pulmonary tuberculosis.**

⇒ **Post primary (secondary tuberculosis). refers to exogenous (new infection) or most commonly endogenous (reactivation) of dominant primary infection. Is characterized by localized in apices of one or both upper lobes and the upper segments of lower lobes (high O2 concentration).**

⇒ **Miliary tuberculosis. Blood dissemination of tuberculin bacilli give rise to military, may occur in young adult and old age as a complication of primary tuberculosis.**

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Tuberculosis

❖ **Predisposing factors :-** **That lower the body resistance.**

- **Environmental factors :-** **such as malnutrition, poverty, overcrowding, unhygienic condition, alcoholism and heavy smoking.**

- **Pathological factors :-** **such as DM, steroid, chronic lung disease, lymphoma, and cytotic drugs.**

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Tuberculosis

- ***Clinical features:***
  - ***pulmonary disease***
    - **Primary pulmonary TB**
      - **A few patients develop a self-limiting febrile illness but clinical disease occurs only if there is a hypersensitivity reaction or progressive infection.**
    - **Progressive primary disease**
      - **May appear during the course of the initial illness or after a latent period of weeks or months.**

Tuberculosis

❖ *Clinical features:*

❑ *pulmonary disease*

➢ **Post-primary pulmonary TB**

- **It is most frequently pulmonary and characteristically occurs in the apex of an upper lobe, where the oxygen tension favors survival of the strictly aerobic organism.**
- **The onset is usually insidious, developing slowly over several weeks.**
- **Systemic symptoms include fever, night sweats, malaise and loss of appetite and weight, and are accompanied by progressive pulmonary symptoms.**
- **Very occasionally, this form of TB may present with one of the complications listed below.**

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Tuberculosis

❖ *Clinical features:*

❑ *pulmonary disease*

➢ **Post-primary pulmonary TB**

- **Radiological changes include ill-defined opacification in one or both of the upper lobes, and as progression occurs, consolidation, collapse and cavitation develop to varying degrees.**
- **It is often difficult to distinguish active from quiescent disease on radiological criteria alone but the presence of a miliary pattern or cavitation favors active disease.**
- **In extensive disease, collapse may be marked and results in significant displacement of the trachea and mediastinum.**
- **Occasionally, a caseous lymph node may drain into an adjoining bronchus, leading to tuberculous pneumonia.**

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Tuberculosis

- ***Clinical features:***
  - ***pulmonary disease***
    - **Miliary TB**

- **May present acutely but more frequently is characterized by 2–3 weeks of fever, night sweats, anorexia, weight loss and a dry cough.**

- **Hepatosplenomegaly may develop and the presence of a headache may indicate coexistent tuberculous meningitis.**

- **Auscultation of the chest is frequently normal but in more advanced disease widespread crackles are evident.**

Tuberculosis

- ***Clinical features:***
  - ***pulmonary disease***
    - **Miliary TB**

- **Fundoscopy may show choroidal tubercles.**

- **The classical appearances on chest X-ray are of fine 1–2 mm lesions (‘millet seed’) distributed throughout the lung fields, although occasionally the appearances are coarser.**

- **Anaemia and leucopenia reflect bone marrow involvement.**

Tuberculosis

❖ *Clinical features:*

➢ Complications of chronic pulmonary Tuberculosis

Pulmonary	Non-pulmonary
• Massive haemoptysis	• Empyema necessitans
• Cor pulmonale	• Laryngitis
• Fibrosis/emphysema	• Enteritis
• Atypical mycobacterial infection	• Anorectal disease
• Lung/pleural calcification	• Amyloidosis
• Aspergilloma/chronic aspergillosis	• Poncet's polyarthritis
• Obstructive airways disease	
• Bronchiectasis	
• Bronchopleural fistula	

Tuberculosis

❖ *Clinical features:*

- ***Extrapulmonary disease;*** **Accounts for 20% of cases in those who are HIV-negative but is more common in HIV-positive patients.**

➢ Lymphadenitis

- **Lymph nodes are the most common extrapulmonary site of disease.**
- **Cervical and mediastinal glands are affected most frequently, followed by axillary and inguinal.**
- **May represent primary infection, spread from contiguous sites or reactivation.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ **Lymphadenitis**

- **The nodes are usually painless and initially mobile but become matted together with time.**
- **Approximately half of cases fail to show any constitutional features.**
- **The tuberculin test is usually strongly positive.**
- **During or after treatment, paradoxical enlargement, development of new nodes and suppuration may all occur but without evidence of continued infection.**

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Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ Gastrointestinal tuberculosis

- **TB can affect any part of the bowel.**
- **Upper gastrointestinal tract involvement is rare.**
- **Ileocecal disease accounts for approximately half of abdominal TB cases.**
- **Fever, night sweats, anorexia and weight loss are usually prominent and a right iliac fossa mass may be palpable.**
- **Up to 30% of cases present with an acute abdomen.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ Gastrointestinal tuberculosis

- Ultrasound or CT may reveal thickened bowel wall, abdominal lymphadenopathy, mesenteric thickening or ascites.
- Barium enema and small bowel enema reveal narrowing, shortening and distortion of the bowel, with caecal involvement predominating.
- Diagnosis rests on obtaining histology by either colonoscopy or mini-laparotomy.
- The main differential diagnosis is Crohn's disease.
- Tuberculous peritonitis is characterized by abdominal distension, pain and constitutional symptoms.

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ Gastrointestinal tuberculosis

- **The ascitic fluid is exudative and cellular, with a predominance of lymphocytes.**
- **Laparoscopy reveals multiple white ‘tubercles’ over the peritoneal and omental surfaces.**
- **Low-grade hepatic dysfunction is common in miliary disease, in which biopsy reveals granulomas.**
- **Occasionally, patients may be frankly icteric, with a mixed hepatic/cholestatic picture.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ **Pericardial disease**

- **Disease occurs in two forms: pericardial effusion and constrictive pericarditis.**
- **Fever and night sweats are rarely prominent and the presentation is usually insidious, with breathlessness and abdominal swelling.**
- **Coexistent pulmonary disease is very rare, with the exception of pleural effusion.**
- **Pulsus paradoxus, a raised JVP, hepatomegaly, prominent ascites and peripheral oedema are common to both types.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ **Pericardial disease**

- **Pericardial effusion is associated with increased pericardial dullness and a globular enlarged heart on chest X-ray, and pericardial calcification occurs in around 25% of cases.**
- **Constriction is associated with an early third heart sound and, occasionally, atrial fibrillation.**
- **Diagnosis is based on the clinical, radiological and echocardiographic findings.**
- **The effusion is frequently blood-stained.**
- **The addition of glucocorticoids to anti-tuberculosis treatment has been shown to help both forms of pericardial disease.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ Central nervous system disease:-

- **Meningeal disease represents the most important form of central nervous system TB.**
- **Unrecognised and untreated, it is rapidly fatal.**
- **Even when appropriate treatment is prescribed, mortality rates of 30% have been reported, while survivors may be left with neurological sequelae.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ Bone and joint disease

- **The spine is the most common site for bony TB (Pott's disease).**
- **Usually presents with chronic back pain and typically involves the lower thoracic and lumbar spine.**
- **The infection starts as a discitis and then spreads along the spinal ligaments to involve the adjacent anterior vertebral bodies, causing angulation of the vertebrae with subsequent kyphosis.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ Bone and joint disease

- **Paravertebral and psoas abscess formation is common and the disease may present with a large (cold) abscess in the inguinal region.**
- **CT or MRI is valuable in gauging the extent of disease, the amount of cord compression, and the site for needle biopsy or open exploration, if required.**
- **The major differential diagnosis is malignancy.**
- **Important complications include spinal instability or cord compression.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ Bone and joint disease

- **TB can affect any joint but most frequently involves the hip or knee.**
- **Presentation is usually insidious, with pain and swelling; fever and night sweats are uncommon.**
- **Radiological changes are often non-specific but, as disease progresses, reduction in joint space and erosions appear.**
- **Poncet's arthropathy is an immunologically mediated polyarthritis that usually resolves within 2 months of starting treatment.**

Tuberculosis

❖ *Clinical features:*

❑ *Extrapulmonary disease;*

➢ **Genitourinary disease**

- **Fever and night sweats are rare with renal tract TB and patients are often only mildly symptomatic for many years.**
- **Haematuria, frequency and dysuria are often present, with sterile pyuria found on urine microscopy and culture.**
- **In women, infertility from endometritis, or pelvic pain and swelling from salpingitis or a tubo-ovarian abscess occurs occasionally.**
- **In men, genitourinary TB may present as epididymitis or prostatitis.**

Tuberculosis

❖ *Investigations*

- The presence of an otherwise unexplained cough for more than 2–3 weeks, particularly in regions where TB is prevalent, or typical chest X-ray or CT changes should prompt further investigation.

- **X ray (PA view) :-**

⇒ In earl stage ill-defined opacities usually in one of the upper lobe.

⇒ In advanced stage opacities are larger, widespread and may be bilateral.

⇒ Cavitation.

⇒ Displaced trachea and heart shadow especially in complication.

Tuberculosis

❖ *Investigations*

- **Sputum for AFB :-**

- **Direct microscopy of a sputum smear remains the most important first step.**

- **Microscopic ex at least 3 specimens of sputum, prefer collected earl in the morning.**

- **At least two sputum samples (including at least one obtained in the early morning) from a spontaneously produced deep cough should be obtained.**

- **Induced sputum may be used in those unable to expectorate.**

Tuberculosis

❖ *Investigations*

- **Sputum for AFB :-**

- **In selected cases, bronchoscopy and lavage or aspiration of a lymph node may be used.**

- **A positive smear is sufficient for the presumptive diagnosis of TB but definitive diagnosis requires culture.**

- **The probability of detecting acid-fast bacilli is proportional to the bacillary burden in the sputum.**

Tuberculosis

❖ *Investigations*

- **Culture**

- **Smear-negative sputum should also be cultured, as only 10–100 viable organisms are required for sputum to be culture-positive.**

- **A diagnosis of smear-negative TB may be made in advance of culture if the chest X-ray appearances are typical of TB.**

- **The slow growth of MTB on solid (typically between 4 and 6 weeks) and automated and semi-automated liquid (typically around 2 weeks) culture media has prompted the development of rapid NAATs**

Tuberculosis

❖ Investigations

- **Monteux tuberculin skin test :-**

⇒ **Monteux test with purified protein derivatives PPD injectable to skin, the transverse width mm of the induration should be recorded after 48 72 hrs.**

⇒ **MT used to screen active disease and latent infection, but does not distinguish between them.**

⇒ **A negative test does not rule out the diagnosis of TB, but a positive test may be helpful for diagnosis.**

⇒ **Test is positive if the induration is 10 or more in diameter.**

Tuberculosis

❖ *Investigations*

- **Monteux tuberculin skin test :-**

⇒**MT also considered positive if more than 5 for patient with HIV, close contact with active TB or immunocompromised.**

⇒**False positive in infection with non-tuberculosis mycobacterium.**

⇒**False negative may be due to week immunity, immunodeficiency state, and improper testing technique.**

Tuberculosis

❖ *Investigations*

- **NAAT**
  - **(a DNA detection-based NAAT) has the capacity to detect MTB in less than 2 hours.**
  - **It is specific to MTB, it is not sufficiently sensitive to have replaced culture.**
- **Interferon gamma release assay (IGRA):- with antigen specific for mycobacterium tuberculosis also used to screen latent TB.**
- **CBC, ESR, CRP.**
- **Heaf test and tine test :- this simple test used for screening.**

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Tuberculosis

❖ *Investigations*

- **Needle biopsy :-** **from pleural, lymph nodes, and solid lesion within the lung and culture.**
- **Pleural fluid aspiration :- predominant lymphocyte, and culture is positive in less than 20%.**
- **PCR :- it is common and rapid test for detection of mycobacterial DNA in sputum and other fluids within 48 hrs.**

Tuberculosis

❖ *Investigations*

- **The diagnosis of extrapulmonary TB can be more challenging.**
- **Generally fewer organisms (particularly in meningeal or pleural fluid).**

- **Culture, histopathological examination of tissue and/or NAAT may be required.**
- **Adenosine deaminase in pleural, pericardial, cerebrospinal and ascitic fluid, and so may assist in confirming suspected TB.**

- **In the presence of HIV, examination of sputum may still be useful, as subclinical pulmonary disease is common.**
- **Lateral flow urinary lipoarabinomannan assay (LF-LAM) may be useful in the severely ill patient with a CD4 count of 100 cells/μL or less.**

Tuberculosis

❖ *Management*

- **General measures :-**

⇒ Isolate patients with possible TB in private room with negative pressure.

⇒ Have medical staff wear high efficiency disposable masks.

⇒ Continue isolation until sputum smears are negative for 3 consecutive times (usually after 2 4 wks. of treatment).

Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ **The treatment of TB is based on the principle of an initial intensive phase to reduce the bacterial population rapidly, followed by a continuation phase to destroy any remaining bacteria.**

- ✓ **Standard treatment involves 6 months' treatment with isoniazid and rifampicin, supplemented in the first 2 months with pyrazinamide and ethambutol.**

- ✓ **Fixed-dose tablets combining two or three drugs are preferred.**

Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ **Treatment should be commenced immediately in any patient who is smear-positive, and in those who are smear-negative but with typical chest X-ray changes and no response to standard antibiotics.**

- ✓ **12 months of therapy is recommended for meningeal TB, including involvement of the spinal cord in cases of spinal TB; in these cases, ethambutol may be replaced by streptomycin.**

- ✓ **Pyridoxine should be prescribed in pregnant women and malnourished patients to reduce the risk of peripheral neuropathy with isoniazid.**

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Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ **Where drug resistance is not anticipated, patients can be assumed to be non-infectious after 2 weeks of appropriate therapy.**
- ✓ **Most patients can be treated at home.**
- ✓ **Six months of therapy is appropriate for all patients with new-onset pulmonary TB and most cases of extrapulmonary TB.**

Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ **Admission to a hospital unit with appropriate isolation facilities should be considered where;**
  - **Uncertainty about the diagnosis.**
  - **Intolerance of medication.**
  - **Questionable treatment adherence.**
  - **Adverse social conditions.**
  - **A significant risk of multidrug-resistant TB (culture positive after 2 months on treatment, or contact with known multidrug-resistant TB).**

Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ **Patients treated with rifampicin should be advised that their urine, tears and other secretions will develop a bright, orange/ red coloration.**
- ✓ **Women taking the oral contraceptive pill must be warned that its efficacy will be reduced and alternative contraception may be necessary.**
- ✓ **Ethambutol and streptomycin should be used with caution in renal impairment, with appropriate dose reduction and monitoring of drug levels.**
- ✓ **Adverse drug reactions occur in about 10% of patients but are significantly more common with HIV co-infection.**

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Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ **Baseline liver function and regular monitoring are important for patients treated with standard therapy.**
- ✓ **Rifampicin may cause asymptomatic hyperbilirubinemia but, along with isoniazid and pyrazinamide, may also cause hepatitis.**
- ✓ **Mild asymptomatic increases in transaminases are common but significant hepatotoxicity only occurs in 2–5%.**
- ✓ **It is appropriate to stop treatment and allow any symptoms to subside and the liver function tests to recover before commencing a stepwise re-introduction of the individual drugs.**

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❖ *Management*

➢ Chemotherapy

✓ **Less hepatotoxic regimens may be considered, including streptomycin, ethambutol and fluoroquinolones.**

- **Streptomycin and pyrazinamide contraindication in pregnancy.**
- **All anti TB are safe for lactating mother and is not harmful to nursing neonate.**

- **In renal impairment avoid ethambutol, and aminoglycosides.**
- **In severe liver disease best used she thereby.**

Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ Glucocorticoids are currently recommended in pericardial or meningeal disease.
- ✓ May benefit in TB of the ureter, pleural effusions and extensive pulmonary disease.
- ✓ Can suppress hypersensitivity drug reactions.
- ✓ Surgery should be considered in cases complicated by massive hemoptysis, loculated empyema, constrictive pericarditis, lymph node suppuration, and spinal disease with cord compression, but usually only after a full course of anti-tuberculosis treatment.

Tuberculosis

❖ *Management*

➢ Chemotherapy

- ✓ **The effectiveness of therapy for pulmonary TB is assessed by further sputum smear at 2 months and at 5 months.**
- ✓ **Treatment failure is defined as a positive sputum smear or culture at 5 months or any patient with a multidrug-resistant strain, regardless of whether they are smear-positive or negative.**
- ✓ **Extrapulmonary TB must be assessed clinically or radiographically, as appropriate.**

Tuberculosis

❖ *Management*

➢ Monitoring response to treatment :-

- Clinical assessment.

- Sputum for AFB smear monthly until become negative.

⇒ By the end of 3 rd. months of treatment all patient should be smear negative.

⇒ If smear remain positive at or beyond 3 months, treatment failure or drug resistance should be suspected.

- Chest x ray is performed initially and at the end of treatment for comparison.

- A base line LFT because hepatitis is a major complication of anti TB.

Tuberculosis

❖ *Management*

➢ Treatment failure:-

- **Said when the patients sputum culture remain positive after 3 months, or AFB smear remain positive after 5 months.**

- **Drug resistance usually develops when patient uses single drug thereby or irregular tokening properly prescribed thereby.**

- **In this cases added at least 2 or 3 drugs that have never been used before.**

Tuberculosis

❖ *Management*

➢ Directly observed therapy

- ✓ **Poor adherence to therapy is a major factor in prolonged illness, risk of relapse, and the emergence of drug resistance.**
- ✓ **Directly observed therapy (DOT) involves the supervised administration of therapy 3 times weekly to improve adherence.**
- ✓ **DOT has become an important control strategy in resource-poor nations.**
- ✓ **It is currently recommended for patients thought unlikely to be adherent to therapy: homeless people and drifters, alcohol or drug users, patients with serious mental illness and those with a history of non-adherence.**

Tuberculosis

❖ *Management*

➢ *Control and prevention*

- ✓ **TB is preventable, particularly so in those with latent TB.**
- ✓ **Supporting the development of laboratory and health-care services to improve detection and treatment of active and latent TB is an important component of this goal.**
- ✓ **The majority of individuals exposed to MTB harbour the bacteria, which remain dormant.**
- ✓ **They do not develop any signs of active disease and are non-infectious.**

Tuberculosis

❖ *Management*

➢*Control and prevention*

- ✓ They are however, at risk of developing active TB disease and becoming infectious.
- ✓ The lifetime risk of TB disease for a person with documented latent TB infection is estimated at 5–15%, with the majority of cases occurring within the first 5 years after initial infection.
- ✓ Latent TB may be identified by the presence of immune responses to *M. tuberculosis* antigens.
- ✓ Contact tracing is a legal requirement in many countries.

Tuberculosis

❖ Management

➢Control and prevention

- ✓ Close contacts who should receive BCG vaccination or chemotherapy.
- ✓ Approximately 10–20% of close contacts of patients with smear-positive pulmonary TB and 2–5% of those with smear-negative, culture-positive disease have evidence of TB infection.
- ✓ Cases are commonly identified using the tuberculin skin test (TST) or an IGRA. An otherwise asymptomatic contact who tests positive but has a normal chest X-ray may be treated with chemoprophylaxis to prevent infection from progressing to clinical disease.
- ✓ Chemoprophylaxis should be offered to adults up to the age of 65.

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Tuberculosis

❖ Management

➢Control and prevention

- ✓ It should also be considered for HIV-infected close contacts of a patient with smear-positive disease.
- ✓ A course of rifampicin and isoniazid for 3 months or isoniazid for 6 months is effective.
- ✓ Tuberculin skin testing may be associated with false-positive reactions in those who have had a BCG vaccination and in areas where exposure to non-tuberculous mycobacteria is high.
- ✓ The skin tests may also be falsely negative in the setting of immunosuppression or overwhelming TB infection.

Tuberculosis

❖ *Management*

➢*Control and prevention*

- ✓ **IGRAs detect the release of interferon-gamma (IFN-γ) from sensitized T cells in response to antigens, such as early secretory antigenic target (ESAT)-6 or culture filtrate protein (CFP)-10, which are encoded by genes specific to *Mycobacterium tuberculosis* and are not shared with BCG or opportunistic mycobacteria.**

- ✓ **IGRAs are more specific than skin testing as they require a single blood test rather than two clinic visits.**

- ✓ **A dual strategy of TST followed by IGRA is recommended.**

- ✓ **TST remains the first choice in children, while IGRA represents the first choice for individuals with HIV**

Tuberculosis

❖ Management

➢ Control and prevention

❑ Vaccines

- ✓ BCG (the Calmette–Guérin bacillus), a live attenuated vaccine derived from *M. bovis*, is the most established TB vaccine.
- ✓ It is administered by intradermal injection and is highly immunogenic.
- ✓ BCG appears to be effective in preventing disseminated disease, including tuberculous meningitis, in children, but its efficacy in adults is inconsistent and new vaccines are urgently needed.
- ✓ Current vaccination policies usually target children and other high-risk individuals.
- ✓ BCG is very safe, with the occasional complication of local abscess formation.
- ✓ Not be administered to those who are immunocompromised (e.g. by HIV) or pregnant.

Tuberculosis

❖ *Management*

➢ TB and HIV/AIDS

- ✓ **The close links between HIV and TB, with the promotion of programs that link detection and treatment of TB with detection and treatment of HIV.**
- ✓ **It is recommended that all patients with TB should be tested for HIV infection.**
- ✓ **Mortality is high and TB is a leading cause of death in HIV patients.**

Tuberculosis

❖ *Management*

➢ Drug-resistant TB

- **Drug-resistant TB is defined by the presence of resistance to any first-line agent.**

- **Multidrug-resistant tuberculosis (MDR-TB) is defined by resistance to at least rifampicin and isoniazid, with or without other drug resistance.**

- **Extensively drug-resistant tuberculosis (XDR-TB) is defined as resistance to at least rifampicin and isoniazid, in addition to any quinolone and at least one injectable second-line agent.**

Tuberculosis

❖ *Management*

➢ Drug-resistant TB

- ✓ More common in individuals with a prior history of TB, particularly if treatment has been inadequate, and those with HIV infection.
- ✓ Diagnosis is challenging, especially in resource-poor settings, and although cure may be possible, it requires prolonged treatment with less effective, more toxic and more expensive therapies.
- ✓ When MDR-TB is suspected, administration at least 5 drugs for intensive phase of Treatment and at least 4 drugs for the continues phase.
- ✓ The mortality rate from MDR-TB is high and that from XDR-TB higher still.

Tuberculosis

❖ *Management*

➢ Drug-resistant TB

- ✓ **The factors contributing to the emergence of drug-resistant TB.**
  - **Drug shortages.**
  - **Poor-quality drugs.**
  - **Lack of appropriate supervision.**
  - **Transmission of drug-resistant strains.**
  - **Prior anti-tuberculosis treatment.**
  - **Treatment failure (smear-positive at 5 months).**

Tuberculosis

❖ *Prognosis*

- ✓ **Following successful completion of chemotherapy, cure should be anticipated in the majority of patients.**
- ✓ **There is a small (< 5%) and unavoidable risk of relapse.**
- ✓ **Most relapses occur within 5 months and usually have the same drug susceptibility.**
- ✓ **In the absence of treatment, a patient with smear-positive TB will remain infectious for an average of 2 years; in 1 year, 25% of untreated cases will die.**

Tuberculosis

❖ *Prognosis*

- ✓ **Death is more likely in those who are smear-positive and those who smoke.**
- ✓ **A few patients die unexpectedly soon after commencing therapy and it is possible that some have subclinical hypoadrenalism that is unmasked by a rifampicin-induced increase in glucocorticoid metabolism.**
- ✓ **HIV-positive patients have higher mortality rates and a modestly increased risk of relapse.**

Thank you